AMENDMENTS TO THE CLAIMS

Please **AMEND** claim 9 as shown below.

This listing of claims will replace all prior versions, and listings, of claims in the application.

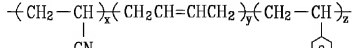
1. (Withdrawn) A binder for a lithium-sulfur battery, comprising:

a butadiene-based copolymer.

2. (Withdrawn) The binder of claim 1, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene copolymer, an acrylonitrile-butadiene copolymer, and a modified styrene-butadiene copolymer.

3. (Withdrawn) The binder of claim 2, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene rubber, an acrylonitrile-butadiene rubber, and a modified styrene-butadiene rubber.

4. (Withdrawn) The binder of claim 1, wherein the butadiene-based copolymer is represented by Formula 1:



(1)

and wherein:

when x is 0, y ranges from about 5 to about 40, and z ranges from about 60 to about 95;

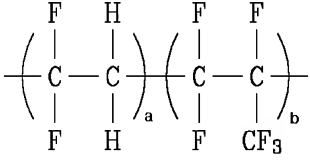
when z is 0, x ranges from about 60 to about 95 and y ranges from about 5 to about 40; and

when x, y, and z do not equal 0, x ranges from about 20 to about 75, y ranges from about 5 to about 20, and z ranges from about 20 to about 75.

5. (Withdrawn) The binder of claim 1, wherein the butadiene-based copolymer is a non-aqueous material.

6. (Withdrawn) The binder of claim 1, further comprising a fluorine-based polymer.

7. (Withdrawn) The binder of claim 6, wherein the fluorine-based polymer is represented by Formula 2:



(2)

and wherein a ranges from about 0.5 to about 1.0, and b ranges from about 0 to about 0.5.

8. (Withdrawn) The binder of claim 6, wherein the fluorine-based polymer is selected from the group consisting of a homopolymer prepared from monomers selected from the group consisting of C_2F_3Cl, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and a copolymer including a first monomer and a second monomer, wherein the first monomer is selected from the group consisting of

C_2F_4, C_2F_3Cl, CH_2CF_2, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and the second monomer is selected from the group consisting of C_2H_4, C_3H_6, CH_2=CHOR where R is a C_1 to C_{20} alkyl group, C_3F_6 and CF_2=CFORf where Rf is a C_1 to C_{20} alkyl group with at least one fluorine atom.

9. (Currently Amended) A positive active material composition for a lithium-sulfur battery, comprising:

a positive active material comprising sulfur or a sulfur-based compound;

a conductive agent;

an organic solvent;

a binder comprising a butadiene-based copolymer, wherein the binder is distributed in the organic solvent to form an emulsion, the binder having ~~with~~ particle sizes of 15 micrometers or less; and

an agent for controlling viscosity.

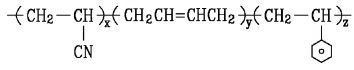
10. (Original) The positive active material composition of claim 9, wherein the binder is presented in the amount of 2 to 6% by weight of the positive active material composition.

11. (Original) The positive active material composition of claim 10, wherein the binder is presented in the amount of 2 to 3% by weight of the positive active material composition.

12. (Original) The positive active material composition of claim 9, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene copolymer, an acrylonitrile-butadiene copolymer, and a modified styrene-butadiene copolymer.

13. (Original) The positive active material composition of claim 12, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene rubber, an acrylonitrile-butadiene rubber, and a modified styrene-butadiene rubber.

14. (Original) The positive active material composition of claim 9, wherein the butadiene-based copolymer is represented by Formula 1:



(1)

and wherein:

when x is 0, y ranges from about 5 to about 40, and z ranges from about 60 to about 95;

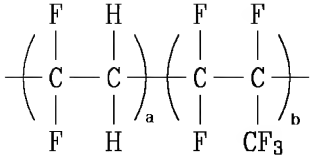
when z is 0, x ranges from about 60 to about 95 and y ranges from about 5 to about 40; and

when x, y, and z do not equal 0, x ranges from about 20 to about 75, y ranges from about 5 to about 20, and z ranges from about 20 to about 75.

15. (Original) The positive active material composition of claim 9, wherein the butadiene-based copolymer is non-aqueous.

16. (Withdrawn) The positive active material composition of claim 9, further comprising a fluorine-based polymer.

17. (Withdrawn) The positive active material composition of claim 16, wherein the fluorine-based polymer is represented by Formula 2:



(2)

and wherein a ranges from about 0.5 to about 1.0, and b ranges from about 0 to about 0.5.

18. (Withdrawn) The positive active material composition of claim 16, wherein the fluorine-based polymer is selected from the group consisting of a homopolymer prepared from monomers selected from the group consisting of C_2F_3Cl, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and a copolymer including a first monomer and a second monomer, wherein the first monomer is selected from the group consisting of C_2F_4, C_2F_3Cl, CH_2CF_2, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and the second monomer is selected from the group consisting of C_2H_4, C_3H_6, CH_2=CHOR where R is a C_1 to C_{20} alkyl group, C_3F_6 and CF_2=CFORf where Rf is a C_1 to C_{20} alkyl group with at least one fluorine atom.

19. (Original) The positive active material composition of claim 9, wherein the agent for controlling viscosity is selected from the group consisting of a cellulose-based polymer, polyvinyl alcohol, polyvinylpyrrolidone, polyacrylic acid, polyacrylamide, polyethyleneoxide, and polyethyleneimine.

20. (Original) The positive active material composition of claim 19, wherein the cellulose-based polymer is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxyethyl-cellulose, or carboxymethyl cellulose.

21. (Withdrawn) A lithium-sulfur battery, comprising:

a positive electrode comprising a positive active material, a conductive agent, and a binder comprising a butadiene-based copolymer;

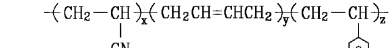
a negative electrode; and

an electrolyte.

22. (Withdrawn) The lithium-sulfur battery of claim 21, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene copolymer, an acrylonitrile-butadiene copolymer, and a modified styrene-butadiene copolymer.

23. (Withdrawn) The lithium-sulfur battery of claim 22, wherein the butadiene-based copolymer is selected from the group consisting of an acrylonitrile-butadiene-styrene rubber, an acrylonitrile-butadiene rubber, and a modified styrene-butadiene rubber.

24. (Withdrawn) The lithium-sulfur battery of claim 21, wherein the butadiene-based copolymer is represented by Formula 1:



(1)

and wherein:

when x is 0, y ranges from about 5 to about 40, and z ranges from about 60 to about 95;

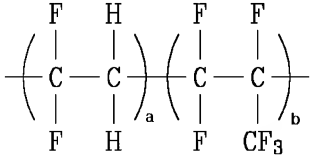
when z is 0, x ranges from about 60 to about 95 and y ranges from about 5 to about 40; and

when x, y, and z do not equal 0, x ranges from about 20 to about 75, y ranges from about 5 to about 20, and z ranges from about 20 to about 75.

25. (Withdrawn) The lithium-sulfur battery of claim 21, wherein the butadiene-based copolymer is non-aqueous.

26. (Withdrawn) The lithium-sulfur battery of claim 21, further comprising a fluorine-based polymer.

27. (Withdrawn) The lithium-sulfur battery of claim 26, wherein the fluorine-based polymer is represented by Formula 2:



(2)

and wherein a ranges from about 0.5 to about 1.0, and b ranges from about 0 to about 0.5.

28. (Withdrawn) The lithium-sulfur battery of claim 26, wherein the fluorine-based polymer is selected from the group consisting of a homopolymer prepared from monomers selected from the group consisting of C_2F_3Cl, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and a copolymer

including a first monomer and a second monomer, wherein the first monomer is selected from the group consisting of C_2F_4, C_2F_3Cl, CH_2CF_2, C_2H_3F and $CH_3(CF_3C_2H_4)SiO$, and the second monomer is selected from the group consisting of C_2H_4, C_3H_6, CH_2=CHOR where R is a C_1 to C_{20} alkyl group, C_3F_6 and CF_2=CFORf where Rf is a C_1 to C_{20} alkyl group with at least one fluorine atom.

29. (Withdrawn) The lithium-sulfur battery of claim 21, wherein the agent for controlling viscosity is selected from the group consisting of a cellulose-based polymer, polyvinyl alcohol, polyvinylpyrrolidone, polyacrylic acid, polyacrylamide, polyethyleneoxide, and polyethyleneimine.

30. (Withdrawn) The lithium-sulfur battery of claim 29, wherein the cellulose-based polymer is selected from the group consisting of methyl cellulose, hydroxypropyl methylcellulose, hydroxyethyl-cellulose, or carboxymethyl cellulose.